

**2.1.3 Plastics:-** Plastic is a substance that can be easily formed or moulded into a desired shape.

Plastic can be formed in a desired shape by the effect of mechanical force & heat.

In the manufacture of plastic raw materials like coal, petroleum, cellulose, salt, sulphur, limestone, air, water etc are used.

### **Plastics as engineering materials:-**

Advantages of plastics over other engineering materials.

- (1) Low fabrication cost, low thermal & electrical conductivities, high resistance to corrosion & solvents.
- (2) The stress – strain relationship of plastics is similar to that of the metals.
- (3) Plastics reduce noise & vibration in machines
- (4) Plastics are bad conductors of heat are useful for making handles used for hot objects, most plastics are inflammable.
- (5) Plastics are electrical insulators & find large scale use in the electrical industry.
- (6) Plastics are resistance to chemicals.
- (7) Plastics are clear & transparent so they can be given beautiful colours.

**Types of Plastic:** - (1) Thermoplastics

(2)Thermosetting plastics.

### **Difference between thermoplastic & thermosetting resins:-**

<b>Thermoplastic resins (or) Polymers</b>	<b>Thermosetting resins</b>
(1) These are produced by additional polymerization	(1) These are produced by condensation polymerization.
(2) The resins are made of long chains attached by weak Vander Waal's force of attraction	(2) The resins have three dimensional network structure connected bonds.
(3) On heating they soften and on cooling become stiff chemical nature won't change	(3) On heating they become stiff & hard. No change on cooling. Chemical nature changes.

<b>(4) They can be remoulded</b>	<b>(4) They cannot be remoulded because once set means they are permanently set</b>
<b>(5) Scrap (waste product) can be used</b>	<b>(5) Scrap cannot be used</b>
<b>(6) The resins are soft, weak and less brittle</b>	<b>(6) The resins are usually hard, strong tough &amp; more brittle</b>
<b>(7) These are easily soluble in some organic substances</b>  <b>E.g.:- PVC, polyethylene etc.,</b>	<b>(7) Resins are not soluble in organic solvents</b>  <b>E.g.:- Nylon, Bakelite etc.,</b>
<b>(8) Contain long chain polymer with no cross linkage.</b>	<b>(8) They have 3D network structure.</b>